

Mathematics

Department Information

- **Department Chair:**
Friedrich Littmann, Ph.D.
- **Graduate Coordinator:**
Indranil Sengupta, Ph.D.
- **Department Location:**
408 Minard Hall
- **Department Phone:**
(701) 231-8171
- **Department Web Site:**
www.ndsu.edu/math/ (<http://www.ndsu.edu/math/>)
- **Application Deadline:**
March 1 to be considered for assistantships for fall. Openings may be very limited for spring.
- **Credential Offered:**
Ph.D., M.S.

The Department of Mathematics offers graduate study leading to the degrees of Master of Science (M.S.) and Doctor of Philosophy (Ph.D.). Advanced work may be specialized among the following areas:

- algebra, including algebraic number theory, commutative algebra, and homological algebra
- analysis, including analytic number theory, approximation theory, ergodic theory, harmonic analysis, and operator algebras
- applied mathematics, mathematical finance, mathematical biology, differential equations, dynamical systems,
- combinatorics and graph theory
- geometry/topology, including differential geometry, geometric group theory, and symplectic topology

Beginning with their first year in residence, students are strongly urged to attend research seminars and discuss research opportunities with faculty members. By the end of their second semester, students select a supervisory committee and develop a plan of study specifying how all degree requirements are to be met. One philosophical tenet of the Department of Mathematics graduate program is that each mathematics graduate student will be well grounded in at least two foundational areas of mathematics. To this end, each student's background will be assessed, and the student will be directed to the appropriate level of study.

The Department of Mathematics graduate program is open to all qualified graduates of universities and colleges of recognized standing. In addition to the Graduate College requirements (<https://nextcatalog.ndsu.edu/graduate/admission-information/>), applicants must have earned a cumulative grade point average (GPA) of at least 3.0 or equivalent in all advanced mathematics courses at the baccalaureate level. Please see the English proficiency requirements ([https://www.ndsu.edu/gradschool/apply/international/#:~:text=Statement%20of%20Marks,-Test%20Scores,-English%20proficiency\)for applicants](https://www.ndsu.edu/gradschool/apply/international/#:~:text=Statement%20of%20Marks,-Test%20Scores,-English%20proficiency)for applicants)) for applicants

Financial Assistance

Teaching assistantships and a small number of research assistantships are available. In addition to the stipend, graduate assistants receive a graduate tuition waiver. Tuition waivers cover base tuition for NDSU graduate credits only. Students are responsible for differential tuition, student fees, and tuition for non-graduate level credits taken or Cooperative Education credits. All students in full standing and, in certain situations, students in conditional status are eligible for assistantships.

For required English proficiency, please see the English Language Proficiency Procedure for Graduate Teaching Assistants (<https://catalog.ndsu.edu/graduate/graduate-school-policies/english-language-proficiency-procedure/#text>).

Assistantship applications will be considered at any time. However, opportunities are improved for those received by March 1 preceding the fall semester of intended enrollment.

At least one year of academic work must be spent in residence at NDSU in fulfilling graduate requirements for each graduate degree earned. The M.S. customarily takes two years to complete; the Ph.D. usually last three years beyond the master's. Students must maintain a cumulative GPA of at least 3.0 throughout their graduate career.

Master of Science

The Master of Science degree is offered in two options: the Plan A Thesis Option or the Plan B Comprehensive Study Option. The Thesis Option emphasizes research and preparation of a scholarly thesis, whereas the Comprehensive Study Option emphasizes a broader understanding of a major area of mathematics.

Departmental Requirements

- At least 30 credit hours in approved graduate-level mathematics course work, depending on the degree option.
 - Thesis Option: At least 6 credit hours of MATH 798 Master's Thesis, in addition to at least 18 credit hours in courses numbered 700-789. These 18 credit hours must include six foundational courses.
 - Comprehensive Study Option: At least 2 credit hours of MATH 797 Master's Paper, in addition to at least 24 credit hours in courses numbered 700-789. These 24 credit hours must include six foundational courses. Subject to the approval of the supervisory committee, at most 6 of the required 30 credits may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics department.
- A grade of Master's Pass in four of the written preliminary examinations offered by the department. These examinations are offered in the areas: algebra, analysis, combinatorics, applied mathematics, and geometry/topology.
- A thesis or expository paper written under the supervision of a faculty member and defended at an oral examination administered by the student's supervisory committee.

Timelines

Per departmental policy candidate has three calendar years from the time of enrollment in the Graduate College to complete the Master's degree. Extensions may be granted after review and approval by the graduate committee.

Doctor of Philosophy

The Doctor of Philosophy degree is awarded in recognition of high scholarly attainment as evidenced by a period of successful advanced study, the satisfactory completion of prescribed examinations, and the development of an acceptable dissertation covering a significant, original aspect of mathematics.

Code	Title	Credits
Foundational Courses		
Algebra		
MATH 720	Algebra I	3
MATH 721	Algebra II	3
MATH 726	Homological Algebra	3
Analysis		
MATH 750	Analysis	3
MATH 754	Functional Analysis	3
MATH 756	Harmonic Analysis	3
Applied Mathematics		
MATH 760	Ordinary Differential Equations I	3
MATH 784	Partial Differential Equations I	3
Combinatorics		
MATH 736	Enumerative Combinatorics	3
MATH 737	Algebraic Combinatorics	3
Geometry/Topology		
MATH 746	Topology I	3
MATH 747	Topology II	3
Graduate Seminar		3
MATH 790	Graduate Seminar	
Doctoral Research		6
MATH 899	Doctoral Dissertation	

- Subject to the approval of the supervisory committee, at most 12 of the required 42 credit hours may be earned in 600-level mathematics courses (excluding 620, 621, 650, and 651) or in courses outside the Mathematics Department. Credits used to satisfy the requirements of a master's degree at NDSU may be included in the 90 credits hours required for the doctoral degree

- Ph.D. A student entering the doctoral program with a master's degree from another institution need only complete 60 credit hours to complete the Ph.D. degree. Half of these 60 credits must be in courses numbered 700-789 excluding those courses numbered 720, 721, 750, and 751.
- A grade of Ph.D. Pass in four written preliminary examinations offered by the department. These examinations are offered in the areas: algebra, analysis, combinatorics, applied mathematics, and geometry/topology.
- A passing grade in a preliminary oral examination administered by the student's supervisory committee after completion of the Preliminary Examinations.
- A dissertation consisting of a written presentation of original and significant research completed by the student under the supervision of a faculty member and defended at an oral examination administered by the candidate's supervisory committee.
- A dissertation video describing the candidate's research, evaluated by the candidate's supervisory committee.

Timelines

Doctoral students must pass the written preliminary examinations by the end of January of their third year in the program. A student advances to candidacy after successful completion of the preliminary oral examination. All students must advance to candidacy by August 31 after their fourth academic year of study. Extensions may be granted after review and approval by the graduate committee.

A student advances to candidacy after completion of the preliminary oral examination. All students must advance to candidacy by August 31st after their fourth academic year of study. Extensions may be granted after review and approval by the graduate committee.

Azer Akhmedov, Ph.D.

Yale University, 2004

Research Interests: Group Theory, Low Dimensional Topology

Maria Angeles Alfonseca, Ph.D.

Universidad Autonoma de Madrid, Spain, 2003

Research Interests: Fourier Analysis, Partial Differential Equations

Nikita Barabanov, Ph.D.

University of Kiev, 1979

Research Interests: Differential Equations, Control Theory, Optimization, Neural Networks

Jason Boynton, Ph.D.

Florida Atlantic University, 2006

Research Interests: Algebra

Catalin Ciuperca, Ph.D.

University of Kansas, 2001

Research Interests: Commutative Algebras, Algebraic Geometry

Dogan Comez, Ph.D.

University of Toronto, 1983

Research Interest: Ergodic Theory, Measureable Dynamics, Operator Theory

Josef Dorfmeister, Ph.D.

University of Minnesota, 2009

Research Interests: Symplectic Topology

Benton Duncan, Ph.D.

University of Nebraska, 2004

Research Interests: Operator Algebras, Noncommutative Functional Analysis

Torin Greenwood, Ph.D.

University of Pennsylvania, 2015

Research Interests: Combinatorics

Friedrich Littmann, Ph.D.

University of Illinois, Urbana-Champaign, 2003

Research Interests: Approximation Theory, Analytic Number Theory

Artem Novozhilov, Ph.D.

Moscow State University of Communication Means, 2002

Research Interests: Mathematical Biology

Indranil SenGupta, Ph.D.

Texas A&M University, 2010

Research Interests: Mathematical Finance and Stochastic Processes

Jessica Striker, Ph.D.

University of Minnesota, 2008

Research Interests: Enumerative, Algebraic, Geometric and Bijective Combinatorics

Abraham Ungar, Ph.D.

Tel-Aviv University, 1973

Research Interests: Differential Equations, Integral Transforms, Wave Propagation, Special Relativity

Ivan Yegorov, Ph.D.

Lomonosov Moscow State University, 2014

Research Interests: Applied Mathematics